

SOYBEAN RUST

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Soybean rust is caused by the fungus *Phakopsora pachyrhizi* Syd. and is considered to be one of the most serious diseases of soybeans, *Glycine max* (L.) Merr., especially in tropical and subtropical areas (1). The rust, on the other hand, appears to be adapted to cooler climates which makes it very hazardous to continental U. S. soybean production (5). Losses from rust can be from 15 to 40 percent (4) to as high as 70 and 80 percent (3). Losses are reflected by premature defoliation of infected leaves, reduction in number of pods, increase in number of unfilled pods, and a reduction in the number, weight, and germinability of seed (1).

Soybean rust occurs predominantly in the eastern hemisphere with its distribution ranging from Australia to India and throughout eastern Asia and Siberia (1). It has also been reported under a variety of other rust designations, all of which have been synonymized by Hiratsuka (2) with *Phakopsora pachyrhizi*. In the western hemisphere some of the reported synonyms have been listed as occurring in Brazil and the United States (1), as well as in Cuba, Trinidad, and St. Thomas (7). More recently, it has been reported in Puerto Rico (7).

Soybean rust is most severe during the humid, rainy season since liquid moisture (free water) accompanied by optimum temperatures of 15 to 25 C is necessary for spore germination and infection of plants (1, 6). Splashing rains and blustery winds appear to aid spore dispersal (N. G. Vakili, Unpublished, Soybean Workshop, Puerto Rico). The primary source of inoculum is not definitely known, but is surmised to be urediospores overwintering on crop debris and supplemental hosts such as wild soybean and other common pasture legumes (1). The existence of races is strongly suspected (1, 7).

The host range (1) of *P. pachyrhizi* includes species in the following plant genera: *Cajanus*, *Canavalia*, *Crotalaria*, *Desmodium*, *Dolichos*, *Glycine*, *Kennedya*, *Lespedeza*, *Lotus*, *Lupinus*, *Macroptilium*, *Packyrkizus*, *Phaseolus*, *Psoralea*, *Pueraria*, *Rhyncosia*, and *Vigna* (including possibly *Mucuna*, *Eridsema* and *Teramnus*).



Fig. 1. Soybean rust lesions on leaves of soybeans.
Overall view (Left) ; Closeup (Right)

SYMPTOMS. Rust spots occur on leaves, petioles, and young stems, but most commonly on the lower surface of leaves as yellow or tan spots, becoming tan or brown with time (fig. 1). The rust pustules are slightly raised, conical-shaped with a pore, and attain a size of about 1 mm². Telial sori containing several teliospores may occur as tiny black dots along the margins of the lesions. The role of this spore form is not yet known (1). Rust-infested leaves turn yellow and drop from the plant.

Rust symptoms on leaves can be confused with other leaf spot-causing organisms such as bacterial (*Xanthomonas*) leaf spot, angular leaf spot caused by *Isariopsis griseola* Sacc., and bean rust caused by *Uromyces phaseoli* (Pers.) Wint. var *typica* Arth. (N. G. Vakili, Unpublished, Soybean Rust Workshop, Puerto Rico).

CONTROL. Effective chemical control of soybean rust varies according to location, weather, cropping, material costs, and labor. However, the following materials have been suggested for control: Dithane M-22 (maneb) or Dithane M-45 (mancozeb) be applied 4 times at 7-day intervals during the susceptible period. As a cultural control method, soybeans should be grown well away from other hosts. Varieties of sufficient resistance are not available but are being developed through research (1). Moreover, the probable existence of races occurring within this rust presents more formidable problems in developing resistant varieties (1, 7).

Literature Cited

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